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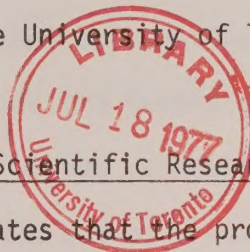
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Government Support of Scientific Research and Development:

an economic analysis, -- a research paper by D.G. McFetridge, prepared for the Ontario Economic Council and published by the University of Toronto Press.

TORONTO, June 21 -- Large, foreign-owned companies with headquarters in Quebec have the highest probability of obtaining research and development subsidies and grants, according to Prof. D.G. McFetridge, author of a research study released today by the Ontario Economic Council and published by the University of Toronto Press.

The author of Government Support of Scientific Research and Development: an economic analysis states that the probability of a firm receiving a subsidy does not differ from year to year, is greater for foreign-owned firms, is not affected by the prior year's R & D budget, increases with the firm's size and peaks at sales of \$280 million, and is higher for companies with headquarters in Quebec. McFetridge adds the caveat that firms having these characteristics may be more likely to apply for assistance, or be more successful, or both.





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While the present system of government scientific R & D subsidies has increased total expenditures and stimulated patenting activities, McFetridge questions whether the resulting inventions have been worth their cost. Assessing the extent to which current government subsidies have gone to support goals other than an efficient economy, he says that such subsidies may even have been used to bolster failing firms. He stresses that any increases in such support must be judged solely by the value of goods and services which can be produced.

Other arguments frequently advanced for increased government subsidies centre around national prestige, he says. Such goals as "keeping Canada from falling behind in the technological race", giving Canada a "presence" in a number of new technologies, "promoting growth" or "creating jobs" may actually act to draw resources away from more productive activities, and thus actually reduce national income.

A case in point is the argument for support of scientific research in universities, based on a social commitment to the accumulation of knowledge for its own sake. Such a decision is a political one, says McFetridge.

"Many writers and policy makers have (incorrectly) asserted that a greater R & D effort would increase our national income in cases where it clearly will not do so", says the report. The author believes that the normal operation of markets will bring about efficient use of resources, and that the state should intervene only if it can demonstrate that this will have an effect which the market, if left to itself, could not bring about.

Where it is argued that R & D should be subsidized simply to keep scientists in Canada, the author says we are often clearly better off to let them go. The migrating scientist may have been educated at public expense with the implicit provision that the public be repaid by subsequent taxation of his/her income, and with emigration there is no such repayment. However, further subsidy only imposes further costs on the balance of the population, he argues. In an attempt to salvage an erroneous decision, Canadians would thus reduce their real incomes even further. Scientific education costs can be more effectively recouped, he suggests, by imposing explicit repayment provisions on the recipient ... provisions which are binding, regardless of ultimate place of residence.

Focusing on conditions under which subsidies should be granted, the report examines the effects of discrimination between foreign and domestic, or between exporting and non-exporting applicants, and the restriction to Canada of the benefits of project results, as well as the problem of determining the size of subsidies to be awarded for individual projects.

The McFetridge report is one of a series of studies prepared by various authors under the auspices of the Ontario Economic Council. The Council is an autonomous economic research body, the purpose of which is to assist in the development and awareness of public policy through research and the sponsorship of conferences.

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NOTE: Selected quotations attached

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Government Support of Scientific Research and Development:
an economic analysis

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SELECTED QUOTATIONS

GOVERNMENT SUPPORT OF SCIENTIFIC RESEARCH AND DEVELOPMENT: AN
ECONOMIC ANALYSIS

D.G. McFetridge, Professor of Economics, Carleton University

A research study prepared for the Ontario Economic Council and
published by the University of Toronto Press.

"If (subsidy recipients) have a common characteristic, a history
of making losses, for example, one can infer that the subsidy
system is being used to achieve a goal, the support of failing firms
in this case, other than that of encouraging R & D. To the extent
that it is employed to alternative ends the subsidy system is less
effective in its primary role, that of encouraging scientific R & D."
(Pg. 86)

"If it is the case that technical progress is fundamentally a matter of genius or of chance, and not related in any systematic manner to economic forces, the analysis has very little relevance. Indeed, if the innovative activity is primarily serendipitous, government science policy with its associated patent grants, subsidies, tax concessions and exhortations to do more research is also irrelevant. The actions of the state will have no effect on the pace of technical knowledge. Fortunately for science policy the predictions of economic model of invention have been in accord with events....(there is evidence that) invention is not outside the economic system...the output of technological advances is sensitive to the same economic factors that influence the output of more pedestrian products and services." (Pg.5)

"The dilemma of the patent system (is that) the owners of the rights to an innovation can earn a positive return only by restricting its use. The patent system provides the incentive to allocate resources to R & D but does so at the cost of restricting the results of such R & D." (Pg. 5)

"Under conditions of perfect certainty one finds that government conduct of R & D with the results made freely available and a patent grant of unlimited duration coupled with the right to engage in price discrimination are equivalent in terms of their allocative efficiency." (Pg. 10)

"The probability of receiving a subsidy is determined principally by the industry in which a firm is operating and, to a lesser extent, by the size of the firm, its ownership, and its location. These results are more likely to reflect the distribution of applicants than a bias in the subsidy system itself." (Pg. 86)

"A subsidy system which does not increase the value of the resources allocated by society to R & D is clearly without justification. It was found that in all cases, the subsidy system had the effect of inducing recipients to increase the value of resources devoted to R & D by at least the amount of the subsidy. To this extent the system has been effective. The extent to which recipients have increased the value of their own resources which are allocated to R & D in response to subsidization has, however, been limited. The system has not, therefore, effected the reallocation expected of it." (Pg. 86)

"Individual R & D projects are risky. ...It has been argued that while individuals must be compensated for bearing risk, the state or society as a whole need not be. Risk bearing is a private but not a social cost. In this case society should undertake the risk bearing function. In operational terms this implies that the government do all R & D or that the government have R & D done by firms or individuals on cost plus contracts. It is conceivable that the state offer to insure all R & D projects for the perfect certainty rate of return. Through the use of partial subsidies and forgivable loans, the state can also bear part of this risk associated with a given project. If it can be demonstrated that the risk can be borne at a lower cost through the state than through the market, we shall assign a risk bearing role to the state." (Pg. 16)

"Given the present state of knowledge, we must conclude that if a project is 'too risky' in the sense that its expected return after allowing for transactions cost and moral hazard is not sufficient to induce any individual (or group) to bear the non-diversified risk associated with it, then it is also 'too risky' for the state. Conduct by the state of R & D projects which would not be undertaken in a market environment cannot be justified on the basis that the appropriate markets for risk-shifting do not exist." (Pg. 19)

"The benefits of industrial R & D will be confined to those who perform it and to those using the new product(s) produced by the new processes which result. This may be a relatively small number of individuals and the benefits involved may constitute a relatively large fraction of their wealth. In this case these benefits should be discounted at the relevant private sector discount rate." (Pg. 21)

"Canadians may have under-or-over-invested in conservation. If so, intervention in natural resources markets may be justified. Similarly, intervention to encourage R & D or some other type of investment may be justified. These decisions can be made independently. Canadians should be aware that conservation and research are not ... complimentary components of a new growth strategy. They are substitutes. An increase in the amounts of both R & D and conservation undertaken necessitates a reduction either in other types of capital formation or consumption or both." (Pg. 25)

"The goal of increasing employment in the manufacturing of new products can be achieved more effectively by direct subsidization of such employment (than by R & D subsidies)." (Pg. 26)

"At the other extreme is the case in which the subsidy is awarded in support of a project which the recipient would have undertaken in any case (an intra-marginal project). The recipient is able to reduce the value of its own resources devoted to R & D by the amount of the subsidy. In this case the subsidy system does not affect the value of resources allocated to R & D. It merely results in the replacement of private with public funds." (Pg. 65)

"The subsidy system has not resulted in a simple replacement of private by publicly controlled resources in the R & D field. On the other hand its success in inducing the private sector to increase its commitment to R & D has been limited to the electrical products industries. Even this limited success may have more to do with both the defence orientation and the thoroughgoing public participation in both the R & D projects and their subsequent exploitation, which is prevalent in this industrial sector. This is a matter for further study." (Pg. 71)